HOW TO ADD TWO USB PORTS TO LINKSYS
WRT54GS Ver.1 AND WRT54G Ver.2 ROUTERS

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OPENING THE CASE

   To do this mod requires opening the case of the router. To do so you must remove the antennas and cut a line through the label that says tampering will void the warranty.
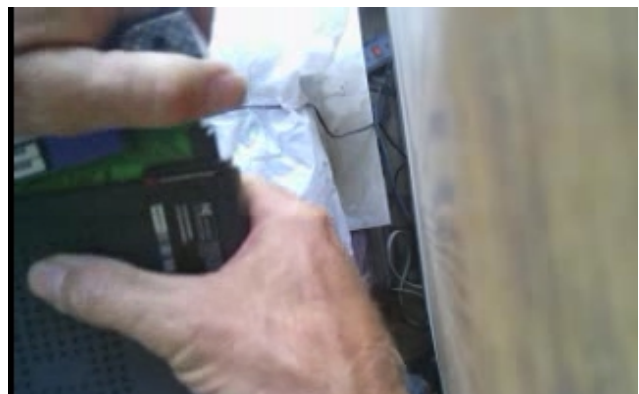

Figure 1

Figure 2

Figure 3

   Next place one hand so the thumb can push down on the bottom case near center and near the case split. Then place the other hand over the router foot as shown in Figure 2. With the thumb on the foot, and pressure in the center with the other hand, rock the foot away from the rear half of the case. You will here a snap as the catch releases and you will have opened the case as shown in Figure 3.
   Remove the face then slide the top half of rear case back toward antenna mounts approximately one eight of an inch then lift up and slide off over antenna mounts.

LOCATE BROADCOM 4712 AND USB PULLUP RESISTORS
RH19-RH22

 For the purpose of this USB mod the wrt54**gs** version 1 and the wrt54**g** version 2 pinouts are identical. On both models we must locate the Broadcom 4712 IC and the resistors to be removed and replaced. Refer to Figure 3 below. Notice there is one resistor, RH17, that remains between the resistors we will replace!

 *note: I have labeled the picture below for ease of identification the USB labels are not on the board!
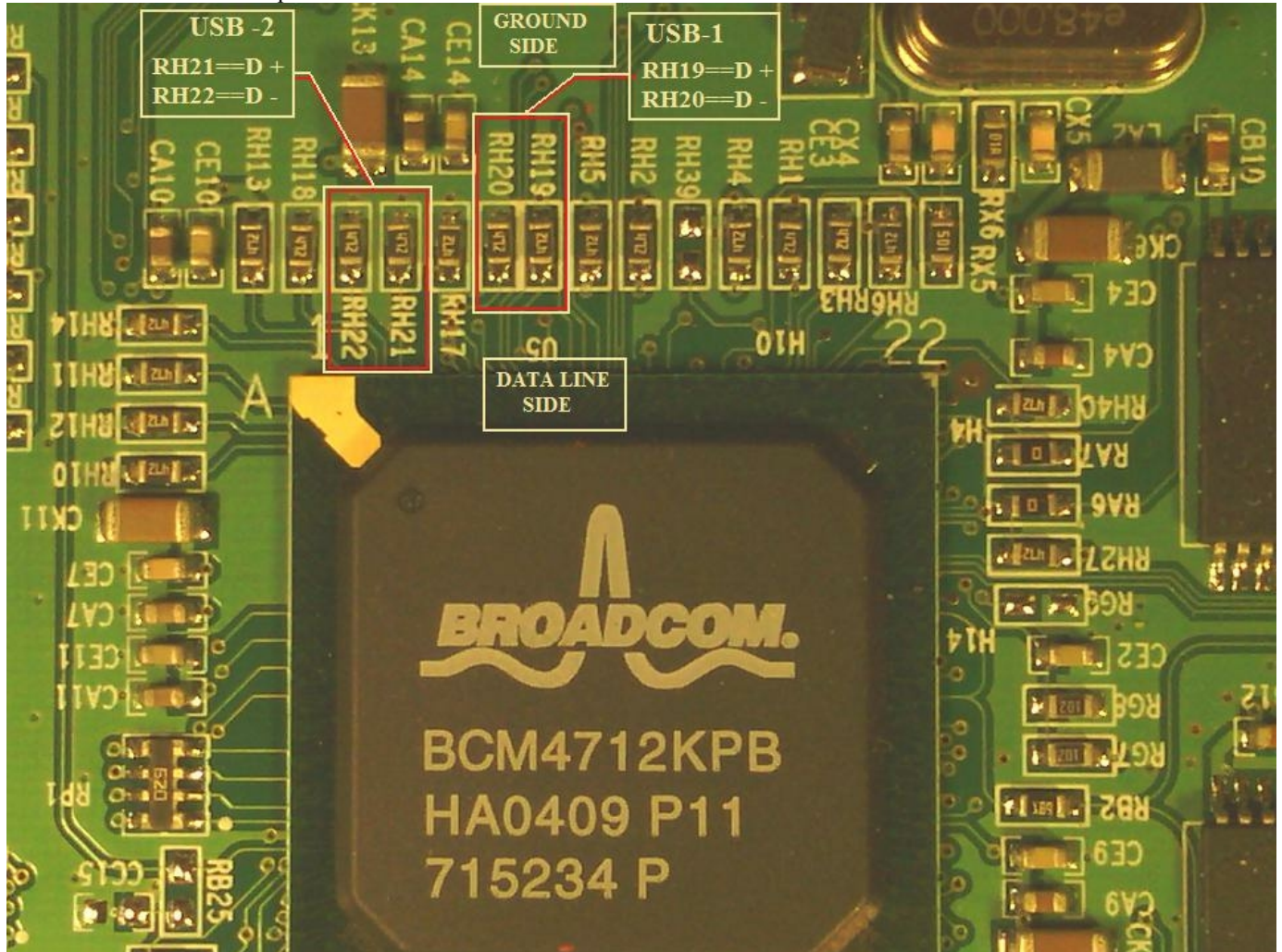

Figure 3

   In my experience of trying various unsoldering techniques, soldering irons, solder suckers and/or solder wick, I have found the use of a 45 watt iron and solder sucker works ok. However, the easiest and fastest is to heat both ends of the resistor at the same time across the top and slide the resistor off the pc board solder pads. A Caveat to mention is that sometimes in unsoldering the resistors a pad may lift and remain attached to the resistor. See Figure 4.
  It has been my experience that this happens more often when using a low wattage iron which requires a longer time heating the joint. Hopefully it won't happen but if you do lift a pad don't panic thinking the router is a loss it is not!
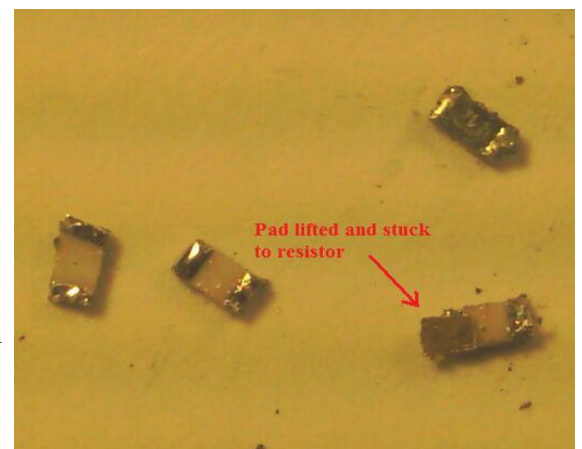

Figure 4

If/when you lift a pad simply clean the protective coating off the land that went up to that pad then tin it so when the replacement resistor is positioned over it you will have a good electrical soldered connection.

Figure 5 shows the pc board with the original 4.7k ohm resistors removed and the remaining pads re-tinned ready to install the 15K ohm replacement resistors that are shown installed in Figure 6 .
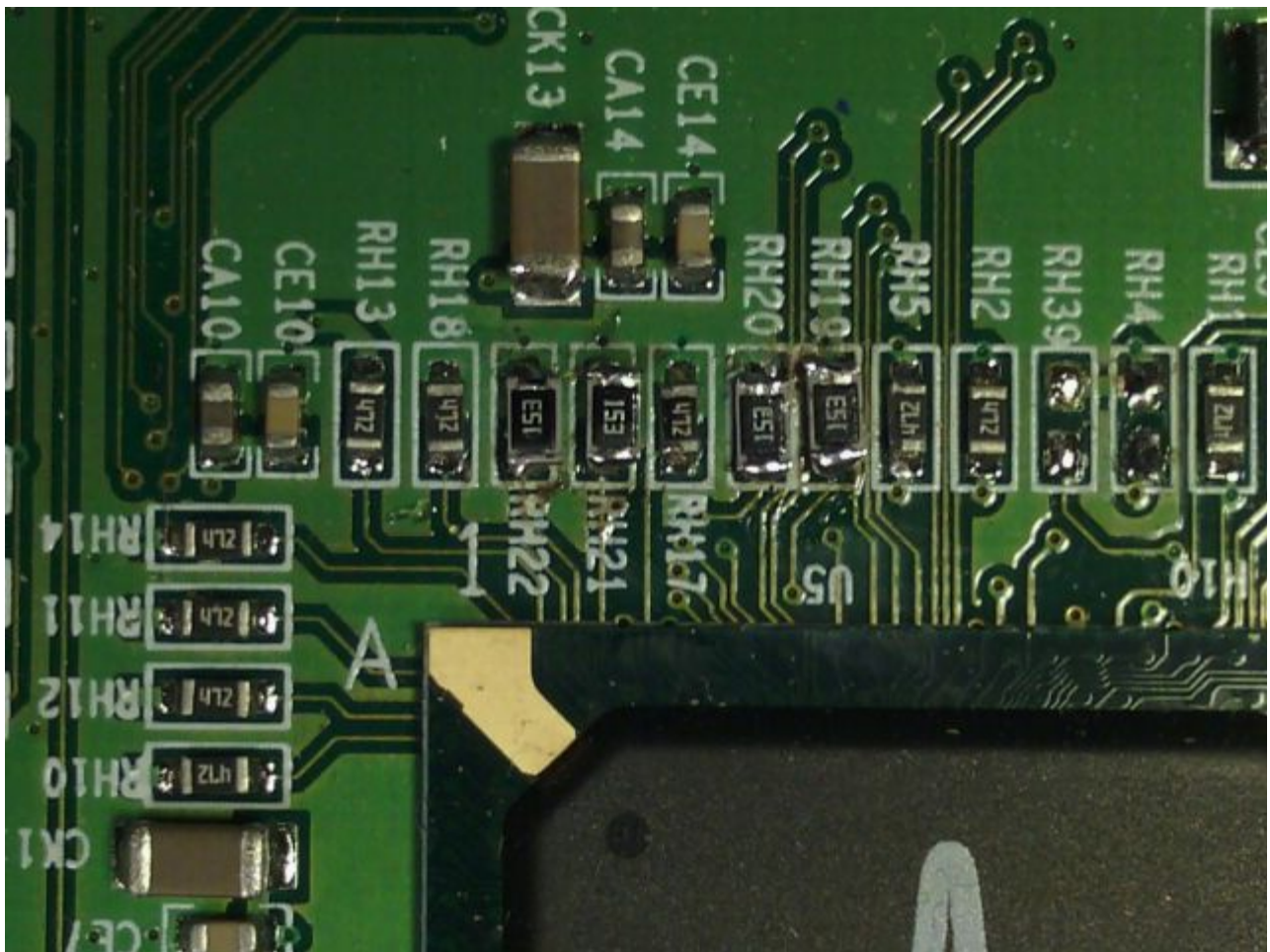

Figure 5

Figure 6

ATTACHING DATA LINES

After the resistors are installed it's time to connect data lines to the data end of the resistors. The data end is the end of the resistor closest to the Broadcom 4712 chip. Refer back to Figure 3 for identification as to the location of USB1 and USB2's D+ and D– data lines. My preferred connection is with a piece of old IDE hard drive cable, because it is plentiful here and the fact it is flexible; making the connection simpler. [Pre-tin the cable ends]

Next I apply some hot glue under and over the cable, as shown in Figure 7, this provides strain relief to assure the cable doesn't move around to short or break at the connections junction.
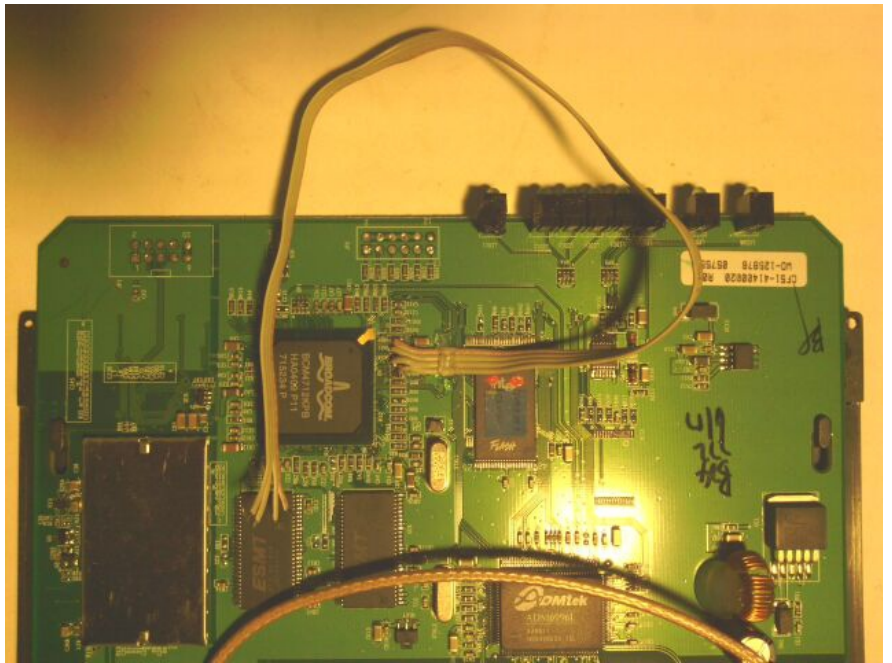

Figure 7

USB PORTS NEED A +5 VDC SUPPLY

In order to be able to go mobile with the unit, and simply for convenience of using a single 12 VDC supply, I use a L7805CV 1.5 amp +5 VDC regulator to supply the USB ports with the required +5 VDC. Figure 8 shows the schematic of the circuitry I use. Credit going to "Void Main's WRT54GSv3 USB Mod", however, these schematics I have provided using to MS Paint.
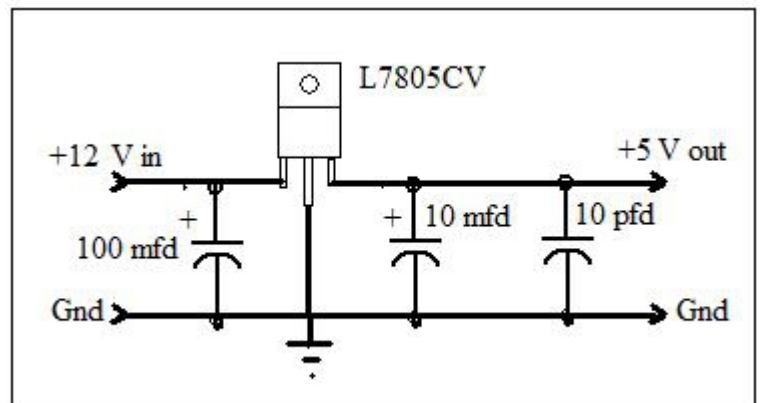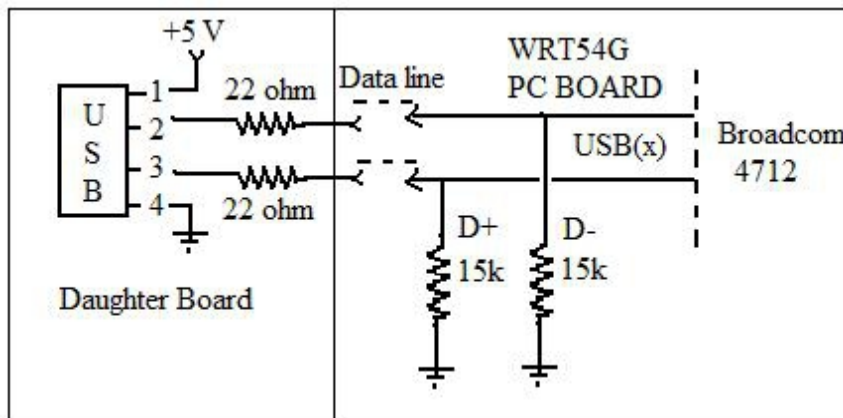

Figure 8

Figure 9

Figure 9 is a schematic of the data connection components that are incorporated. Some of the components are on the router board as indicated, and the balance are on a daughter-board.

Figure 10 is a picture of the USB sockets I have begun using because they are readily available on ebay and through other parts suppliers. [Originally I used recycled USB ports from old computers, however, that turned out to be a bigger hassle then paying a couple of dollars for new sockets.]
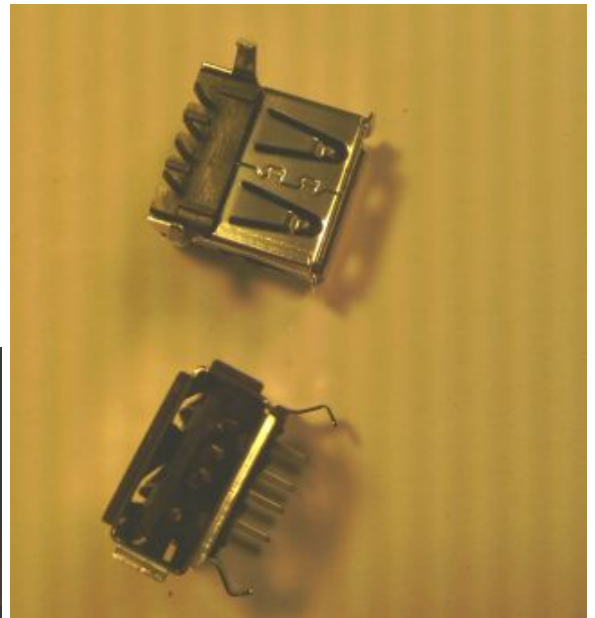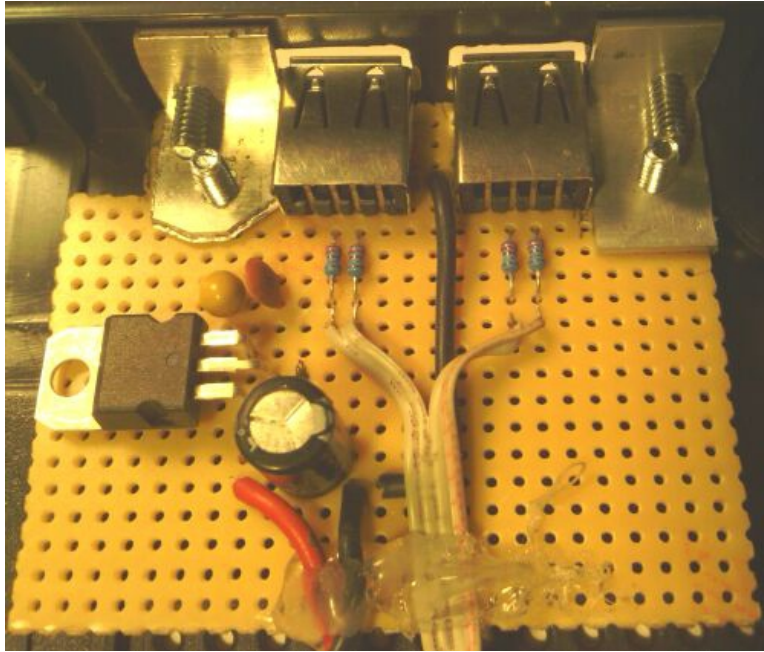

Figure 10

Figure 11

Figure 11 shows the top side lay out of the Perf-board that I use as a daughter-board holding the remaining circuity involved in doing the USB mod. The board is held to the case with aluminum angle drilled and tapped for #6-32 machine screws.

Figure 12 shows my wiring layout on the bottom side of the daughter-board. The component placement and wiring methods are not critical. This is the forth router I have modified and each one I have used different USB sockets, which more so dictated the layout than any other factor. On this layout in order to give something to anchor the USB sockets I have soldered the socket shield anchors to a piece of #14 solid copper wire.
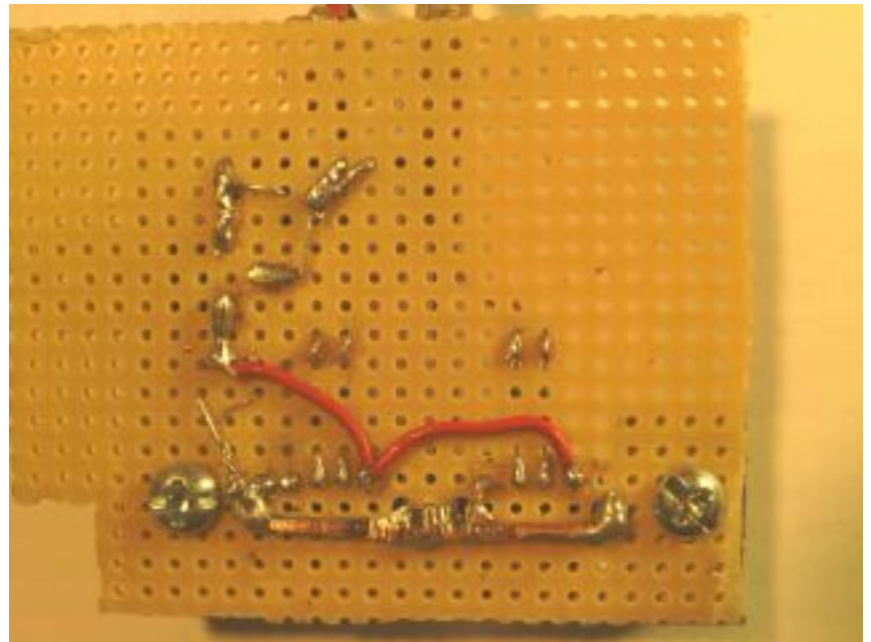

Figure 12

Figure 13 shows the connection to the WRT54G's +12V supply. The connection is made on an available pad by the 12 volt supply socket on the routers pc board.
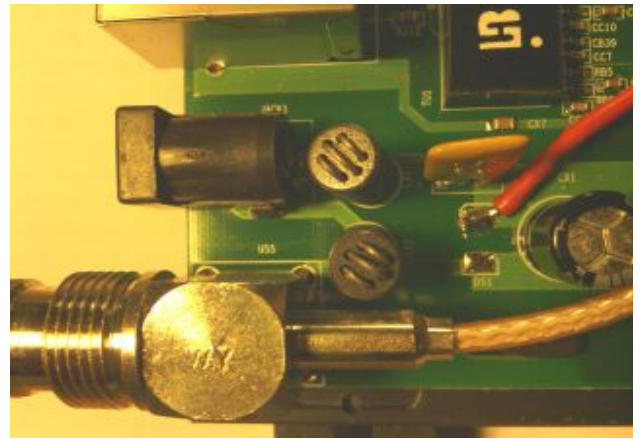

Figure 13

The ground, black wire, is attached to the board after scratch and tinning a spot on the WRT54G's pc board as shown in Figure 14.

Figure 14

Figure 15 show the daughter-board in position inside the router's case. Figure 16 below shows the USB port openings and counter-sunk screw holes for securing the daughter-board to the top half of the routers case.
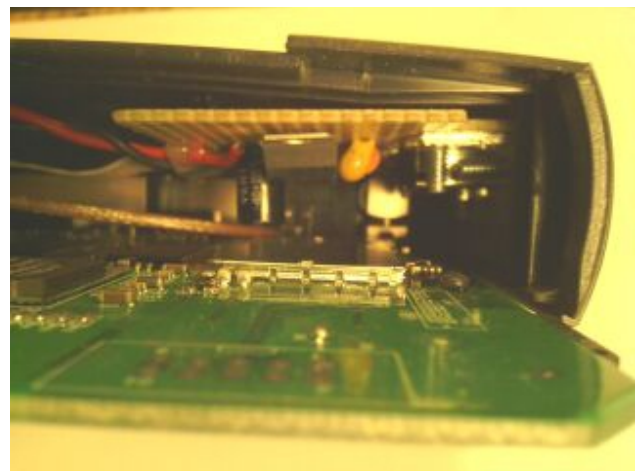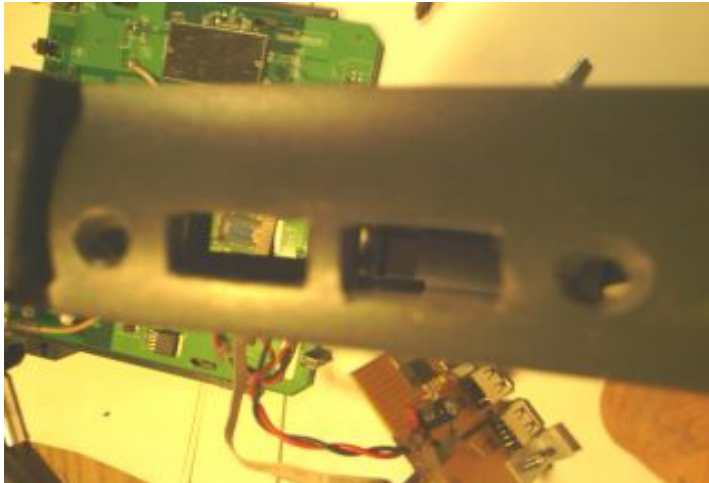

Figure 15

Figure 16

The image to the right is the completed USB Mod with a mini-SD card to USB flashdrive adapter installed in one of the USB Ports. Hope these instructions have been helpful.

73's   EF7EF   Dan